A Cross-Sectional study of confidence in minor surgical skills amongst junior dentists

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Abstract

Introduction

To work in the National Health Service (NHS) as a dentist, the practitioner needs to be on the UK dental 'performer's list.' To apply for access to this list and work as a General Dental Practitioner (GDP), dentists must be qualified from the European Economic Area (EEA) or, those trained in the United Kingdom, must undertake Dental Foundation Training (DFT). Dentists interested in further taught learning or pursuing specialist training must continue working as 'Dental Core Trainees' (DCTs). Most of these jobs are available in Oral and Maxillofacial Surgery Units (OMFS), and require dentists to undertake unsupervised surgical procedures.

It is currently estimated that over 400 'junior dentists' undertake DCT a year. It is the aim of this study to ascertain if confidence in simple surgical procedures improves when compared to GDPs of similar experience.

Methods

102 junior dentists, 34 DFTs, 20 DCT1s, 21 DCT2s and 27 second & third year post DFT GDPs all working across the Midlands, UK, had Likert scale responses about confidence in 14 minor surgical skills assessed. Results were analysed to ascertain if gender, year group and number of extractions had any effect on confidence.

Conclusions

We conclude that confidence in minor surgical procedures improves significantly when undertaking DCT OMFS posts, with the most significant improvement in confidence occurring within the first 6 months. DCTs become significantly more confident in their surgical ability within the first six months when compared to GDPs with longer post-graduate experience.

Keywords

Junior dentist, confidence, surgery

Introduction

For individuals who wish to pursue any of the 13-specialist dental training pathway in the UK, a year undertaking DCT is a pre-requisite. The Committee of Postgraduate Dental Deans and Directors (COPDEND) anticipate that, in 2017, over 400 eligible dentists will undertake a DCT post. Most of these jobs within OMFS units, which are typically based within general hospitals, and allow junior dentists to work within a multidisciplinary team of single and dually qualified doctors and dentists, nurses and other healthcare professionals.

OMFS is recognised as a medical specialty in Europe, and structured engagement in the specialty allows dental juniors to gain exposure of complex medical issues, alongside obtaining supervised training in the management of such conditions.[1] It is important to note that in the UK, entry into OMFS Training requires both medical and dental degrees, however there are still a limited number of single qualified surgeons nearing retirement age.[2] Work delegated to dental juniors should be suitable for a single qualified dentist to undertake.

Due to the unique and valuable learning opportunities these posts offer, and the large amount of interest of pursuing specialty training amongst juniors, the number of dentists undertaking these posts seems likely to increase.[3] It has even been suggested that DFT posts should all be two years long, with a mandatory year in an OMFS unit as a DCT.[4] It would therefore be prudent to ascertain if current OMFS DCT posts allow trainees to gain significant improvement in confidence of minor surgical procedures when compared to GDPs of similar experience.

Assessing confidence is important, as links have been made between surgical confidence and competence in surgically trained individuals.[5] When it is considered that this survey was undertaken by post-graduate dentists who will have passed standardised exams to complete their degree, alongside completing a surgical teaching module as part of their undergraduate training, the link between confidence and competence should be well developed.

This survey allows us to assess the progress in surgical confidence made by dental juniors advancing through postgraduate training. We also aim to ascertain if there are any shortcomings present in the undergraduate curriculum, resulting in a lack of confidence when juniors begin working unsupervised. We will also compare the confidence of juniors who

have and have not had hospital experience, which may demonstrate a clear benefit of these posts.

Null hypothesis: Individuals that undertake Dental Core Training posts in Oral and Maxillofacial Surgery have no increase in surgical confidence when compared to General Dental Practitioners of similar post-graduate experience.

Methods

Previously validated email survey questionnaires were sent out to DCTs and DFTs enrolled in deanery approved posts within the Midlands of the UK. To recruit GDPs, the survey was also sent to practices which have, or have had, a DFT within this geographical region in the past 3 years, as DFTs often continue working as a GDP at the same practice following completion of their initial training year. The survey was validated internally via a pilot study with undergraduate students, expert review and Cronbach's Alpha test (alpha =0.84). The survey contained 14 Likert scale questions related to surgical confidence in minor surgical procedures. These procedures were chosen as they include level 1 (which should be performed unsupervised by GDPs) and selected level 2 (which DCTs would be expected to undertake unsupervised) procedures from the 2015 Oral Surgery Commissioning Guidance.[6] As dentists who qualified in the EEA can work unsupervised in the NHS, and there should be homogeneity of undergraduate dental degree content across Europe, practitioners should also feel confident to undertake level 1 procedures regardless of whether they plan to work in the UK.[7] The surveys were completed and returned anonymously. All responses were entered into an excel spreadsheet.

As we have analysed the mean of Likert data collected from participants, parametric tests are appropriate for data analysis.[8] A t-test was therefore used to ascertain if the difference in confidence was significant based on gender or year group. A Pearson's Correlation Coefficient was used to find if there was any correlation between confidence and number of teeth extracted. One way ANOVA testing was used to ascertain if there was any significant difference in confidence across all 4 cohorts.

Each Likert scale response was scored 1-5, with 1 being completely unconfident to attempt and 5 being fully confident to perform unassisted. The data collection form is shown in

Figure 1, and lists the 14 procedures we questioned about. We also elicited information on respondent's gender and how many teeth they had extracted.

Results

The survey was sent to 151 junior dentists, with 123 replies (81% response rate). We believe the response rate was so high amongst hospital trainees due to the email being circulated officially by the deanery administrative team amongst DCTs and DFTs. All DCT2 respondents had undertaken at least 6 months of OMFS DCT. Due to the timing of the questionnaire, DCT1 respondents analysed had undertaken 6 months of OMFS DCT. Those without OMFS experience were excluded. There were insufficient DCT3 respondents to analyse their responses, so these were excluded. All GDP respondents analysed had no OMFS experience. Those with OMFS experience were excluded.

There were limited numbers of 1st year post-DFT GDPs who responded to the survey. Their reported confidence levels were inconsistent and significantly different to 2nd and 3rd year GDP respondents. Due to DFT scheme start and finish dates, some first-year GDP respondents had only been in their job for a matter of weeks, leading to the inconsistent findings. First year-post DFT GDPs were therefore excluded. There was no significant difference in confidence of second and third year GDP respondents, which is why they have been placed into one cohort for this study.

With a 5% margin of error at 95% confidence and a maximum potential respondent population size of 130 (based on inclusion criteria), the minimum sample size required is 98. We received, and analysed, 102 junior dentist responses which met our inclusion criteria (21 respondents excluded). We can therefore assume our sample is representative of junior dentists working across the midlands.

The range of confidence in DFT (out of 70) is 45-69. The mean overall confidence is 54.06 (SD = 5.70), the median is 54.5. These trainees are most confident at providing intra-oral anaesthesia, with a mean confidence of 4.91 (SD = 0.29). They are least confident at taking an intra oral biopsy, with a mean confidence of 1.59 (SD 0.82). The mean number of teeth extracted by females in this cohort is 109 and males is 186. Males are significantly more confident than females in this cohort ($p=0.004$). There is moderate positive correlation between confidence and number of teeth extracted ($R^2=0.45$).

The range of confidence in DCT1 (out of 70) is 54-70. The mean overall confidence is 62.95 (SD = 4.11), the median is 64. This cohort is most confident at providing intra-oral anaesthesia and extracting incisors, with a mean confidence of 4.95 (SD = 0.22 for both). They are least confident at taking an intra-oral biopsy, with a mean confidence of 3.4 (SD = 0.99). The mean number of teeth extracted by females in this cohort is 208 and males is 225. Males are, in general, more confident than females in this cohort, but not significantly (p=0.39) There is no correlation between confidence and number of teeth extracted (R^2=0.002).

The range of confidence in DCT2 (out of 70) is 54-70. The mean overall confidence is 64.90 (SD = 4.78), the median is 67. This cohort is most confident at extracting incisors, with a mean confidence of 4.95 (SD = 0.22). They are least confident at raising an intra-oral flap, with a mean confidence of 4.04 (SD = 0.86). The mean number of teeth extracted by females in this cohort is 362 and males is 655. Females are, in general, more confident than males in this cohort, but not significantly (p=0.09) There is a no correlation between confidence and number of teeth extracted (R^2=0.03).

The range of confidence in GDPs (out of 70) is 46-66. The mean overall confidence is 58.60 (SD = 5.16), the median is 58. This cohort is most confident at providing intra-oral anaesthesia, with a mean confidence of 4.96 (SD = 0.19). They are least confident at providing extra-oral anaesthesia, with a mean confidence of 1.73 (SD = 1.06). The mean number of teeth extracted by females in this cohort is 556 and males is 535. Males are, in general, more confident than females in this cohort, but not significantly (p=0.24) There is a no correlation between confidence and number of teeth extracted (R^2=0.03).

When analysing all year groups together, DCT1s are significantly more confident than DFTs (p=0.00001). DCT2s are in general more confident that DCT1s, however not significantly (p=0.09). GDPs are significantly more confident than DFTs (p=0.002). GDPs are significantly less confident than DCT1s and DCT2s (p=0.002 and p=0.000068 respectively). ANOVA testing shows significance across all data (p<0.00001) There is no correlation between number of teeth extracted and confidence (R=0.03). Confidence across all 14 procedures is demonstrated in Fig. 2.

Discussion

The prospect of dental treatment has been reported to make thirty-one percent of dentate adults feel anxious, with 12% stating they suffer from 'extreme dental anxiety.'[9,10] In addition to this, there is seemingly an increasing trend of patients referred to secondary care centres treatment having more complex treatment needs.[11] This results in a complex pool of patients for dental juniors working in the secondary care environment. A survey of Greek patients indicated that the qualification level of their dentist is a contributing factor to their perceived confidence of dental care, meaning junior dentists must appear confident to build trust and successfully manage their patients.[12]

Our results show improvement in simple surgical procedures progressing through structured postgraduate training, with some obvious limitations in surgical skills for those who have not yet undertaken a year of OMFS DCT. Dental juniors in such posts will be responsible for providing treatment in a hospital emergency department. In OMFS training posts, closure of facial lacerations accounts for over 50% of the emergency workload and is within the scope of management expected by a DCT.[13] However, newly qualified dentists feel extremely unconfident in administering extra-oral local anaesthesia (Fig 2) which is a pre-requisite for treating these cases.[14] Confidence in delivering extra-oral anaesthesia increases greatly when juniors undertake OMFS jobs. There is also a comparative perceived lack of confidence in suturing when compared to other competencies. Patients who require closure of soft tissue lacerations cannot be treated without dental knowledge, so junior dentists must be confident in their management (extra-oral anaesthesia and suturing) from day 1 of OMFS employment. It can be understood why GDP responses to similar questions might be so low; they will likely never have had the need to suture an extra-oral laceration. We can appreciate that suturing confidence for GDPs will likely increase following provision of sutures after dental extractions in individuals with compromised coagulation.

Treatment of intra-oral haemorrhage may also require sutures to be placed. Extensive bleeding in the mouth following trauma or surgery, particularly in anticoagulated patients, may post an acute airway risk, meaning confident and timely management is paramount.[15] Such emergency management should be provided by dentists in the primary care setting, followed by appropriate urgent referral to a secondary care centre. Our study indicates that newly qualified dental juniors may also benefit from exposure to incision and drainage of intra-oral abscesses. Although easily manageable, if untreated, they can pose life threatening

problems to at risk individuals.[16] Finally, the incidence of alveolar osteitis ('dry socket') is 1-4% following extraction of erupted teeth, and up to 45% following mandibular third molar removal meaning it is extremely likely that junior dentists both in primary and secondary care centres will encounter, and have to treat, this common post-operative complication unsupervised.[17,18] Teaching of these common issues would have benefit for both undergraduates and newly qualified junior dentists, as knowledge of correct intervention can prevent unnecessary harm and referral for conditions that could easily be managed within the primary care setting.

Intra-oral biopsy is a treatment performed predominantly in the secondary care settings, with less than 15% of General Dental Practitioners reporting that they would be comfortable to provide suchservice.[19] When working in a secondary care centre, there may therefore be an urgent requirement for biopsy in lesions of a suspicious nature. Juniors working within secondary care should therefore be able to perform these unassisted. There is evidence to suggest that routine biopsies should be undertaken in general practice to reduce strain on secondary care services, **cost** and patient inconvenience.[19] By facilitating the learning of such skills to DFTs, and possibly undergraduates, there may be a changing of attitude towards non-urgent biopsy provision in primary care amongst GDPs. Currently, it is clear GDPs do not feel confident in providing such treatment. Conversely, elsewhere in Europe, dental juniors reported feeling confident enough to perform and intra-oral biopsy 'easily.'[20] This means that the skills of EEA-qualified dentists working in primary care may be underutilised within the NHS system.

Cost efficiency should always be considered within best clinical practice, and it has been found that junior dentists are more likely to engage with such 'evidence based dentistry,' when compared to older colleagues.[21] Therefore, encouraging change amongst younger practitioners (both EEA and UK trained) will be more likely to elicit a reform of duties within UK general dental practice, which could result in improved patient convenience and satisfaction, alongside reducing NHS expenditure on secondary care services.

Regarding simple extractions, using forceps and elevators we did not find any significant difference between our respondents. There was an improvement from newly-qualified to more experienced postgraduate practitioners in response to all questions.

Only in DFT is there any evidence of males being significantly more confident than females. In DCT1, DCT2 and GDPs there is no evidence of any statistically significant difference in confidence. Regarding this, we are aware that females are superior at retrieval of facts from long-term memory and use of verbal information.[22] It may be that immediately following graduation dental juniors are not yet undertaking any postgraduate examinations, meaning males are therefore simply more confident in 'doing the job.' As junior dentists begin to prepare for postgraduate examinations, or want to gain knowledge for new jobs, this may benefit female juniors who become more confident with increased knowledge.

It may be surprising to see a lack of correlation between number of teeth extracted and confidence, however we believe this is likely due to junior dentists estimating the number of teeth extracted. Recording all surgical interventions and teeth extracted may improve the validity of these data. DFT responses indicate some correlation between confidence and number of teeth extracted. This could be because as this cohort are newly qualified and have extracted fewer teeth, they can estimate the number more accurately, however it is difficult to ascertain if this is truly the cause.

In medical settings, a focussed 'surgical skills elective,' increased confidence in junior surgeons, and is something that could be considered for junior dentists, and may be appropriate for dentists interested in both secondary and primary care environments.[23] An ideal time for such a course may be immediately prior to undertaking a post in a secondary care centre, or as part of the undergraduate curriculum to ensure all junior dentists have the same basic knowledge of oral surgery. It was also of noted by 6 respondents (in a free text box) that as undergraduates they only received one week of shadowing in an OMFS department. This may not be sufficient for students to identify surgical role models within this specialty. It is important for undergraduates to have adequate exposure to all aspects of dental and maxillofacial surgery as identification of such a role model can ultimately promote the desire to pursue a surgical career.[24]

The study has limitations, such as only surveying one deanery and measuring confidence and not competence (their maximum ability) or performance (their day-to-day ability). As a counter argument, links between confidence and competence have been made, within both medical and dental surgery.[5,25] We accept that performance is a distinct construct to

competence, however as junior dentists in training posts are continuously being assessed as part of their career development, they will always strive to perform to their highest ability.[26]

Our method of sampling and data collection also means there may be some sampling error and bias. We chose an email survey as younger dentists are likely to be in a demographic who are computer literate whilst also reducing the postage costs associated with the study. However, the demographic of potential respondents to an online survey is undoubtedly different to that of a paper questionnaire.[27] Additionally, it is typically individuals who do not reply to surveys who are poorer in terms of the behaviour questioned in the study; an individual who feels unconfident surgically may not wish to disclose exactly how unconfident they feel.[27] This may also mean respondents over-exaggerate how confident they feel, to ensure they are not the 'least confident' respondent. This may also affect the number of teeth disclosed as extracted by respondents; they will report larger numbers of extractions as they do not want to appear clinically incompetent.

We accept there are some issues in our methodology, however we believe we have a representative sample of junior dentists **from our population sample**. **Additionally, the consistency of improvement in surgical confidence would indicate that the anonymity of questionnaires has elicited honesty in responses.[27]**

Conclusions

Our results demonstrate that, within our surveyed cohort, there may be some undergraduate training shortcomings related to simple surgical procedures leading to some limitations of the surgical skill-sets of dental juniors. It is apparent that DFTs do not feel fully confident in simple skills which may be required in general dental practice, such as raising an intra oral flap. There is also low confidence for procedures that would routinely be undertaken by an OMFS DCT, such as provision of intra oral biopsy. Increasing confidence within these procedures via hands on sessions prior to DCT1 could be beneficial to the large number of graduates who wish to pursue an OMFS DCT post.

The minor surgical confidence of GDPs with no OMFS experience increases, but not to the same extent as it does amongst DCTs. Data from our sample demonstrates that there is clear benefit in undertaking an OMFS DCT post, as it enabled junior dentists to feel more confident when undertaking minor surgery.

This indicates that junior dentists **involved in our study** gained benefit from structured training posts within secondary care surgical units. Those that returned to GDP jobs after OMFS DCT may be more confident, resulting in a reduction in unnecessary referrals to secondary care centres. **Surveyed** DCTs became significantly more confident in their surgical ability within the first six months when compared to GDPs with longer post-graduate experience.

Further studies are required, with a sample of dental students and junior dentists studying at multiple dental schools and deaneries to fully understand the level of confidence in carrying out surgical procedures across all training grades. We therefore intend to recruit a larger sample including junior dentists, GDPs and dental undergraduates for further analysis.

Ethics & Conflict of Interest

This project has ethical approval from Birmingham Community Hospitals NHS Foundation Trust.

Conflicts of interest: none

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Figures

Fig. 1: The data collection questions utilised.

Fig. 2: A graph showing mean confidence of each cohort across the surgical competences assessed.

Fig 1

This is a short survey to ascertain confidence of junior dentists in minor surgical procedures.
Please circle 1 response, with 1 being not confident at all to attempt and 5 being fully confident to perform unassisted

Advise extraction to a patient (i.e. extraction is indicated)

1 2 3 4 5

Give local anaesthetic intra-orally

1 2 3 4 5

Give local anaesthetic extra-orally

1 2 3 4 5

Use a couplands elevator

1 2 3 4 5

Use extraction forceps

1 2 3 4 5

Extract an incisor (non-surgical)

1 2 3 4 5

Extract a canine (non-surgical)

1 2 3 4 5

Extract a pre-molar (non-surgical)

1 2 3 4 5

Extract a molar tooth (non-surgical)

1 2 3 4 5

Raise an intra-oral flap

1 2 3 4 5

Take an intra-oral biopsy

1 2 3 4 5

Place sutures

1 2 3 4 5

Treat dry socket

1 2 3 4 5

Incise and drain an intra-oral abscess

1 2 3 4 5

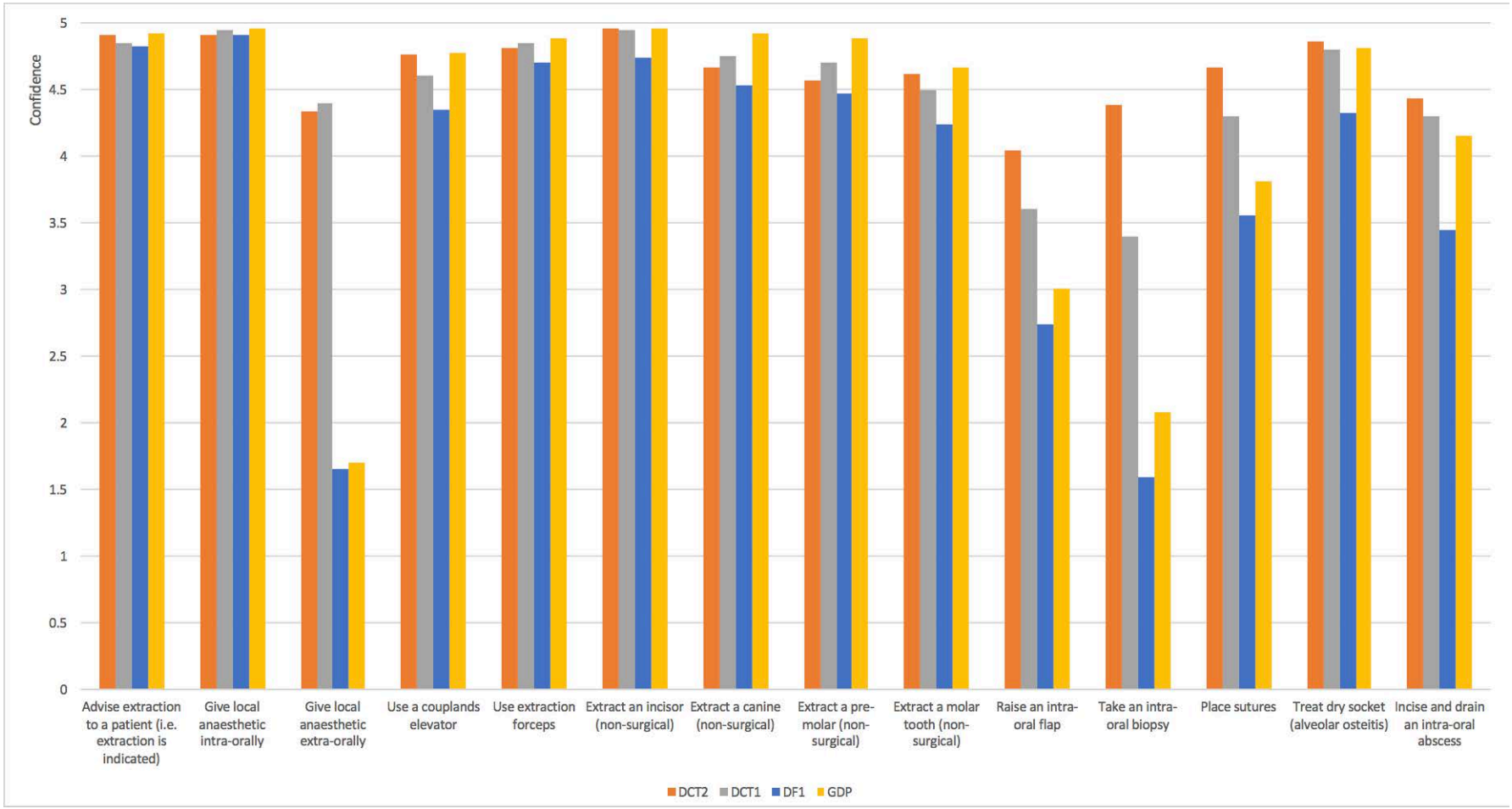
Gender **M** **F**

(To the nearest 5) Number of teeth extracted: **Worked as an OMFS DCT:**

Year Group: DFT DCT1 DCT2 DCT3 **Y** **N**

GDP (1 Year Post DFT) GDP (2 Years Post DFT) GDP (3 Years Post DFT)

Fig 2


Confidence
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Advise extraction to a patient (i.e. extraction is indicated)
Give local anaesthetic intra-orally
Give local anaesthetic extra-orally
Use a couplands elevator
Use extraction forceps
Extract an incisor (non-surgical)
Extract a canine (non-surgical)
Extract a pre-molar (non-surgical)
Extract a molar tooth (non-surgical)
Raise an intra-oral flap
Take an intra-oral biopsy
Place sutures
Treat dry socket (alveolar osteitis)
Incise and drain an intra-oral abscess
DCT2
DCT1
DF1
GDP